Features and usage examples of wAP device

Maris Bulans MikroTik, Latvia

> MUM Mongolia June 2017

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Overview

- Gift from MikroTik wAP
- Repeater Setup
- CAPsMAN overview and basic config







Black and White edition





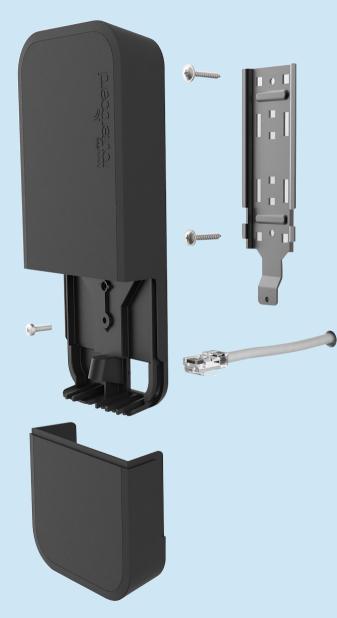
Features

- CPU 650 MHz
- RAM 64 MB
- Flash 16 MB
- Wireless 802.11b/g/n dual-chain
- Gain 2dBi antennas
- Ethernet 10/100Mbps
- Dimensions 185 x 85 x 30 mm

Features cont

- Wide input Voltage (11-57V)
- 802.3af/at, Passive PoE and power jack
- Low Power Consumption (up to 4W)
- High Operating Temp (-40C to +70C)
- Weatherproof case design suitable for indoor and outdoor

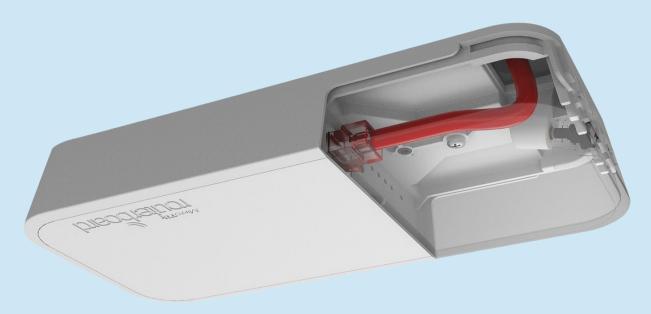
Usage Cases



Use it on the wall!

 Wall mounting is easy thanks to the provided drill template and screw anchor. Everything included

Usage Cases



Use it on the ceiling!

- The WAP comes bundled with all the necessary things to be mounted on ceiling
- Cable breakout provides ability to run cable through the ceiling

Default Configuration

- Ether1 configured as WAN port
 - Firewall protection (only ping allowed)
 - Masquerade enabled
 - DHCP client enabled
 - Neighbour discovery disabled
- Fast-track enabled
- Default local IP: 192.168.88.1/24
- Wireless access point enabled
- SSID: MikroTik-<last 6 chars from MAC>
- DHCP server on wireless AP

How to Connect

Ethernet (WAN) port is protected

- Connect laptop to wireless and use Winbox/WebFig, telnet or ssh
- Connect android phone to wireless and use TikApp or WebFig
- Default IP address 192.168.88.1
- Default username: admin w/o password

Default configuration can be switched to CAP mode by holding reset button for 10 seconds.

- Wireless and ethernet bridged
- DHCP client enabled on bridge interface

TikApp

- · Sign to testing program, link on Mikrotik forum
- Download TikApp in Play store

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Connect To	
192.168.88.1 Login	
admin Password	
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SAVE	CONNECT
-App v0.0.33	
\bigtriangledown	

Secure the Router

- Connect and set username/password
- Disable 'admin' user
- Set WPA and WPA2 key to secure AP

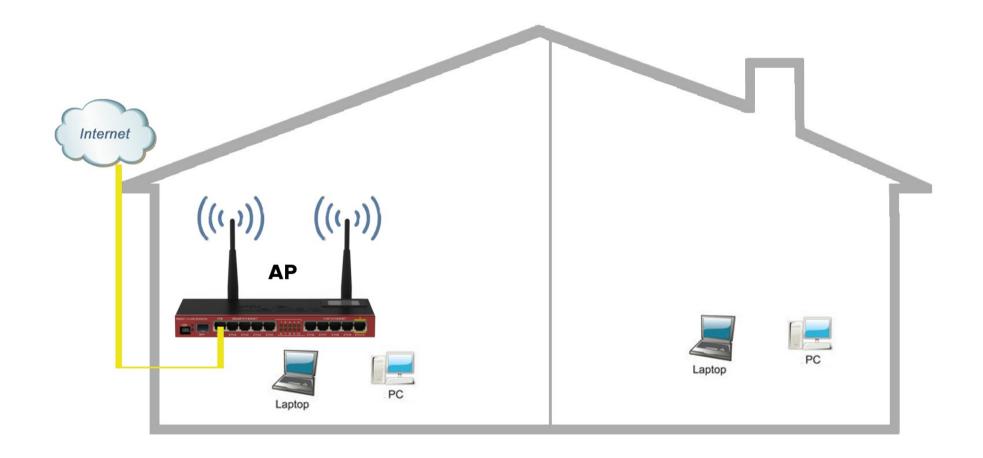
Repeater at Home

Routers have great coverage, but consumer devices (laptops, mobile phones, refrigirators, toilet seats) does not.

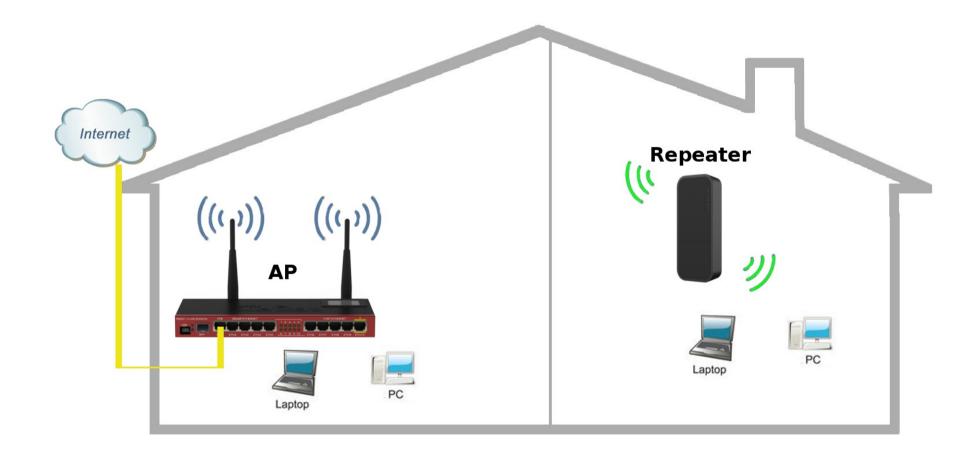
Wireless repeaters extend your wireless network range without requiring you to add any wiring.

Repeater should have two wireless interfaces or set up virtual AP.

Repeater at Home



Repeater at Home



Repeater Setup

Configure wireless settings manually to connect to MikroTik access point:

- Configure security profiles (authentication-type, mode, key)
- Configure wireless settings (station mode,band, SSID)

For repeater setups station mode should be "station-bridge" (works only with MT APs).

Or use wireless scan feature.

Wireless Scan

Fastest way to connect to AP

Wireless	Tables												
Interfac	es Nstreme Dual	Access List	Registration (Connect Lis	t Secur	ity Profile	s Channels						
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3 items (1 selected)												

TikApp Scan

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≡ Interfaces _{Scanner}			$\equiv \frac{\text{Interfaces}}{\text{Running}}$		
Interface wlan1-local Background Scan		•	Interface: wlan1-local Address: D4:CA:6D:FA:FE:40 SSID: r201 Channel: 2412/20/g Signal Strength: -64 Noise Floor: 0 Signal To Noise: 0 Radio Name: D4CA6DFAFE40 RouterOS Version: 6.36rc18		
			Interface: wlan1-local Address: D4:CA:6D:B0:E1:B5 SSID: ez_2011UAS Channel: 2412/20/g Signal Strength: -41 Noise Floor: 0 Signal To Noise: 0 Radio Name: D4CA6DB0E1B5 RouterOS Version: 6.36rc18	5	
		0	Interface: wlan1-local Address: D4:CA:6D:A2:7E:D4 SSID: Anrijs-2011 Channel: 2412/20/g Signal Strength: -69 Noise Floor: 0 Signal To Noise: 0 Radio Name: D4CA6DA27ED4 RouterOS Version: 6.99	1	
		C	Interface: wlan1-local Address: E4:8D:8C:49:3D:B2 SSID: MT-CAP Channel: 2412/20-Ce/gn		0
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Background Scan

- Supported for 802.11 protocol only
- Working conditions
 - •Wireless interface should be enabled
 - •For AP mode when operating on fixed channel
 - For Station mode when connected to AP
- Supported also on Virtual interfaces
 - Scan is only performed in channel where master interface is running
- Allows to save the scan results in a CSV format file

Repeater Setup

- · Add virtual AP interface
- · Use the same SSID and security settings
- · Add bridge interface with static MAC address
- · Bridge physical wireless interface with virtual AP
- Add DHCP client on bridge interface for management(optionally)

Test troughput

Measure troughput between wireless devices

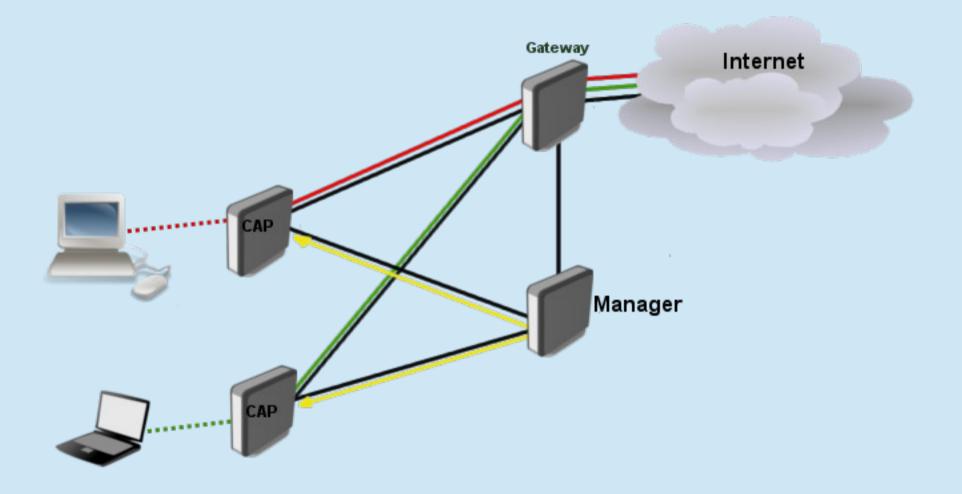
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🕗 Partition	Flood Ping	Local UDP Tx Size: 1500	
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😧 Manual	IP Scan	Remote UDP Tx Size: 1500	
S New WinBox	MAC Server	Direction: receive	
Exit	Netwatch	TCP Connection Count: 20	
	Packet Sniffer		
	Ping	Local Tx Speed: bps	
	Ping Speed	Remote Tx Speed: v bps	
	Profile	Random Data	
	RoMON	User: pauls	
	SMS	Password:	
	Telnet		
	Torch	Lost Packets: 304	
	Traceroute	Tx/Rx Current: 0 bps/35.8 Mbps	
	Traffic Generator	Tx/Rx 10s Average: 0 bps/26.6 Mbps	
	Traffic Monitor	Tx/Rx Total Average: 0 bps/42.4 Mbps	
		Tx: Rx: 35.8 Mbps	

WPS Client Support

- Allows wireless client to get Pre-Shared Key configuration of the AP that has WPS Server enabled
- Gets information from any WPS Server running or can be specified to get only with specific SSID or MAC address
- Received configuration is shown on the screen and can be also saved to a new wireless security profile

- Controlled Access Point system Manager (CAPsMAN)
- Network consists of a number of 'Controlled Access Points' (CAP)
- CAP requires almost no configuration
 - connectivity to CAPsMAN (IP or MAC)
 - wireless lock to capsman
- Packet processing:
 - central (default),
 - local forwarding.

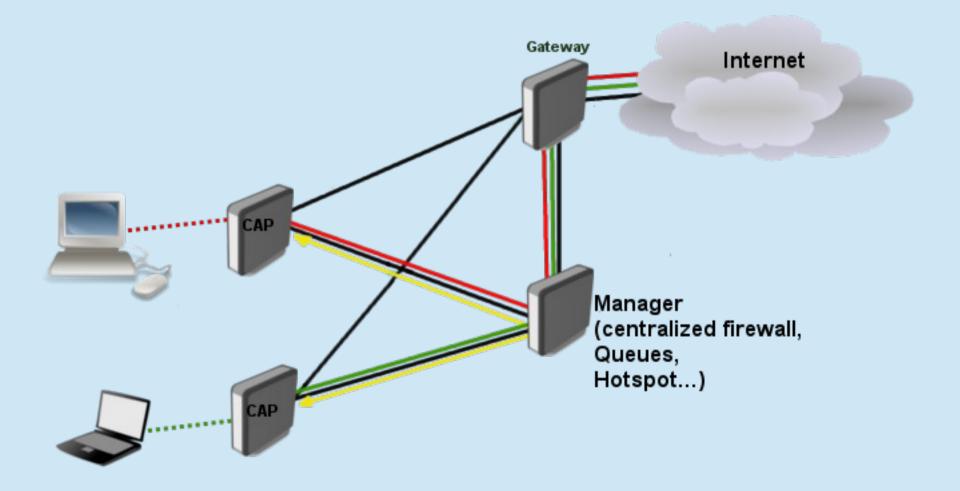
Local Forwarding



Local Forwarding

- Pros:
 - Manager can be router with weak CPU
 - Link between manager and gateway not so important
 - Clients do not loose connectivity to internet after CAPsMAN failure
- Cons:
 - Not so friendly for central management
 - Hotspot, firewall, queues, DHCP server in most cases handled locally by CAPs

Central Forwarding



Central Forwarding

- Pros:
 - Easy service management on single router
 - Hotspots, DHCP servers, firewall etc can be controlled by groups on single machine
- Cons:
 - Single point of failure (backup CAPsMAN can be set)
 - Hardware must be powerful with fast CPU
 - Link between Manager and Gateway must be stable and fast.

CAP Configuration

Wireless Tables							
Interfaces Nstreme Dual Access Lis	t Registrati	ion Connect	List Sec	curity Profiles	Channels		
+ ×× @ 7	САР	WPS Client	Setup	Repeater :	5canner	Freq. Usage	Alignment
Name 🛆 Type		Actual MTU	Tx		Rx		Tx Packet (p/s)
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≪-≫wlan2 Virtual				0 bps	;	0 bps	
CAP		4			×		
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			-	ј ок	4		
Interfaces:				Cancel			
Certificate:	CAPsMAN-C	A-000C42006	535C Ŧ	Apply			
Discovery Interfaces:	lo		₹ \$				
	Lock To C	EAPsMAN					
CAPsMAN Addresses:			\$				
CAPsMAN Names:			\$				
CAPsMAN Certificate Common Names:			\$				
Bridge:	none		₹	1			
	Static Vir	tual		1			
Requested Certificate:	CAP-000C4:	200635C					
Locked CAPsMAN Common Name:				1			
]			

CAP Configuration

/interface wireless cap set enabled=yes interfaces=wlan1

Oter parameters depending on configuration

caps-man-addresses
discovery-interfaces
Bridge

Default CAP configuration loaded by holding reset button for 10 seconds

- CAP and CAPsMAN can be on the same router, set to 'loopback' or 127.0.0.1
- To provision configuration CAPsMAN needs:
 - To get connection from CAP and discover its interfaces
 - To have configuration parameters
 - To have provisioning criteria

Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Ta Name ASSID Hide SSID Load Bal Country Channel Frequency Band cfg1 cap_test_localhost 2ghz-b/g/n CAPs Configuration <cfg1> Wireless Channel Rates Datapath Security OK Name: fg1 Mode: ap</cfg1>
Name A SSID Hide SSID Load Bal Country Channel Frequency Band cfg1 cap_test_localhost 2ghz-b/g/n 2ghz-b/g/n CAPs Configuration <cfg1> Image: Channel Rates Datapath Security OK Wireless Channel Rates Datapath Security OK Cancel Mode: ap Image: Cancel Apply Image: Cancel <t< td=""></t<></cfg1>
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Mode: ap Apply
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Load Balancing Group:
Remove
Distance:
Hw. Retries:
Hw. Protection Mode:
Frame Lifetime:
Disconnect Timeout:
Keepalive Frames:
Country:
Max Station Count:
Multicast Helper:
HT Ty Chains:
HT Rx Chains:
HT Guard Interval:

CAPsMAN									
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CAPsMAN									
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CAPsMAN	
CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CA	Radio
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b F 🗢 Apply	
Identity Regexp: Disable	
Common Name Regexp: Comment	
IP Address Ranges:	
Action: create dynamic enabled F Remove	
Master Configuration: cfg1	
Slave Configuration:	
Name Format: cap	
Name Prefix:	
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CAPsMAN	
CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CA	Radio
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CAPs	MAN										
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- Possibility to provision different configurations on the same device (2GHz and 5GHz)
 - Create two configurations
 - Create two provisioning criteria (bgn, an or ac)
- Common config parameters can be set in templates (channel, datapath, security)

CAPsMAN Limitations

- 32 Radios per CAP
- 32 Virtual interfaces per master radio interface
- But unlimited CAPs (access points) supported by CAPsMAN
- CAPsMAN v1 not compatible with v2
- No Nstreme, NV2 support

Thank you!